Glossary of Transportation/Air Pollution/Air Quality Terms

Introduction

This glossary provides definitions of terms pertaining to the laws, regulations, programs, and government agencies involved in assuring healthful air quality for Arizona's citizens. This glossary explains some of the scientific terms used to describe air pollutants, air quality, the processes that form them, and their effects on the environment and the population. The glossary also includes transportation and transit terms related to air quality. The primary focus of this glossary is to help interested citizens understand the most commonly used transportation/air pollution/air quality terms.

A

Abatement – A technology applied or a measure taken to reduce or eliminate pollution and/or its impacts on the environment.

Acceptable Daily Intake (ADI) – The highest daily amount of a substance that may be consumed over a lifetime without adverse effects.

Acid Deposition – A comprehensive term for the various ways acidic compounds precipitate from the atmosphere and deposit onto surfaces. It can include (1) wet deposition by means of acid rain, fog, and snow; and (2) dry deposition of acidic particles (aerosols).

Acid Rain – Rain produced when acid chemicals are incorporated into rain, snow, fog or mist that is especially acidic (pH <5.2). Principal components of acid rain typically include nitric and sulfuric acid. These may be formed by the combination of nitrogen and sulfur oxides with water vapor in the atmosphere.

Acute Exposure – One or a series of short-term exposures generally lasting less than 24 hours.

Acute Health Effect – A health effect that occurs over a relatively short period of time (e.g., minutes or hours). The term is used to describe brief exposures and effects that appear promptly after exposure.

Add-on Control Device – An air pollution control device such as carbon absorber or incinerator that reduces the pollution in exhaust gas. The control device usually does not affect the process being controlled and thus is "add-on" technology, as opposed to a scheme to control pollution through altering the basic process itself. (see also pollution prevention.)

Adsorber – An emissions control device that removes VOCs from a gas stream as a result of the gas attaching (adsorbing) onto a solid matrix such as activated carbon.

Adverse Health Effect – A health effect from exposure to air contaminants that may range from relatively mild temporary conditions, such as eye or throat irritation,

shortness of breath, or headaches to permanent and serious conditions, such as birth defects, cancer or damage to lungs, nerves, liver, heart, or other organs.

Aerosol – Particles of solid or liquid matter that can remain suspended in air from a few minutes to many months depending on the particle size and weight.

Agricultural Burning – The intentional use of fire for vegetation management in areas such as agricultural fields, orchards, rangelands, and forests.

Air – So called "pure" air is a mixture of gases containing about 78 percent nitrogen; 21 percent oxygen; less than 1 percent of carbon dioxide, argon, and other gases; and varying amounts of water vapor. (see also ambient air.)

Air Monitoring – Sampling and measuring the atmosphere for the presence of pollutants.

Air Pollutants – Amounts of foreign and/or natural substances occurring at high enough concentrations in the atmosphere that may result in adverse effects to humans, animals, vegetation, and/or materials. (see also air pollution.)

Air Pollution – Degradation of air quality resulting from unwanted chemicals or other materials occurring in the air. (see also air pollutants.)

Air Pollution Watch – An announcement issued when the following day is predicted to be a public health risk due to excessive air pollution.

Air Pollution Warning – An announcement issued when actual air pollution measurements reach levels deemed to be unhealthy by the Environmental Protection Agency.

Air Quality Index (AQI) – A numerical index used for reporting severity of air pollution levels to the public. It replaces the formerly used Pollutant Standards Index (PSI). Like the PSI, the AQI incorporates five criteria pollutants – ozone, particulate matter, carbon monoxide, sulfur dioxide, and nitrogen dioxide – into a single index. The new index also incorporates the 8-hour ozone standard and the 24-hour $PM_{2.5}$ standard into the index calculation. AQI levels range from 0 (Good air quality) to 500 (Hazardous air quality). As the AQI rises, there is a higher the level of pollutants and the greater the likelihood of adverse health effects. The AQI incorporates an additional index category—unhealthy for sensitive groups—that ranges from 101 to 150. In addition, the AQI comes with more detailed cautions.

Air Quality Simulation Model – A mathematical relationship between emissions and air quality that simulates on a computer the transport, dispersion, and transformation of compounds emitted into the air.

Air Quality Standard (AQS) – The prescribed level of a pollutant in the outside air that should not be exceeded during a specific time period to protect public health. Established by both federal and state governments. (see also ambient air quality standards.)

Airshed – A term denoting a geographical area that shares the same air because of topography, meteorology, and climate.

Air Toxics – A generic term referring to a harmful chemical or group of chemicals in the air. Substances that are especially harmful to health, such as those considered under U.S. EPA's hazardous air pollutant program are considered to be air toxics. Technically,

any compound that is in the air and has the potential to produce adverse health effects is an air toxic.

Alternative Fuels – Fuels such as methanol, ethanol, natural gas, liquid petroleum gas (LPG), and electricity that can replace ordinary gasoline. Alternative fuels may have particularly desirable energy efficiency and pollution reduction features. The 1990 Clean Air Act encourages development and sale of alternative fuels.

Ambient Air – The air occurring at a particular time and place outside of structures. Often used interchangeably with "outdoor air." (see also air.)

American Society for Testing and Materials (ASTM) – A nonprofit organization that provides a forum for producers, consumers, and representatives of government and industry, to write laboratory test standards for materials, products, systems, and services. ASTM publishes standard test methods, specifications, practices, guides, classifications, and terminology.

Ammonia (NH_3) – A pungent colorless gaseous compound of nitrogen and hydrogen that is very soluble in water and can easily be condensed into a liquid by cold and pressure. Ammonia reacts with NO_X to form ammonium nitrate—a major $PM_{2.5}$ component in the Western United States.

Apportionment – A law that refers to a statutorily prescribed division or assignment of funds. An apportionment is based on prescribed formulas in the law and consists of dividing authorized obligation authority for a specific program.

Area Sources – Small stationary and non-transportation sources of air pollution that are too small or numerous to be counted as point sources.

Area-wide Sources – Sources of pollution where the emissions are spread over a wide area, such as consumer products, fireplaces, road dust and farming operations. Area-wide sources do not include mobile sources or stationary sources.

Arizona Department of Environmental Quality (ADEQ) –The State agency that oversees environmental and air quality enforcement and regulation.

Arizona Department of Transportation (ADOT) – A State of Arizona agency that plans, engineers, builds, and maintains transportation programs and projects.

Arterial Street – A major thoroughfare characterized by high vehicular capacity and continuity of movement used primarily for through traffic rather than for access to adjacent land.

Asthma – A chronic inflammatory disorder of the lungs characterized by wheezing, breathlessness, chest tightness, and cough. Two things happen inside the lungs—constriction, tightening of the muscles surrounding the airways, and inflammation, with swelling and irritation of the airways.

Atmosphere – The gaseous mass or envelope of air surrounding the Earth. From ground level up, the atmosphere is further subdivided into the troposphere, stratosphere, mesosphere, and the thermosphere.

Attainment – Meeting the air quality standards.

Attainment Area – A geographical area identified to have air quality as good as, or better than, the national ambient air quality standards (NAAQS). An area may be an attainment area for one pollutant and a nonattainment area for others. Thus, an area

could be both attainment and nonattainment at the same time. Attainment areas are defined using federal pollutant limits set by EPA.

Authorization Act – Basic substantive legislation or other action empowering an agency to implement a particular program and also establishes an upper limit on the amount of funds which can be appropriated for that program. (see ISTEA and TEA-21)

Average Daily Traffic (ADT) – The average number of vehicles passing a fixed point in a 24-hour time frame. ADT is used to measure traffic volume.

B

Banking – A provision in air district permit regulations that allows a facility to accumulate credits for reducing emissions beyond regulatory limits (emission reduction credits) and then use or sell those credits at a later date.

Best Available Control Measure (BACM) – A term used to describe the "best" measures (according to U.S. EPA guidance) for controlling small or dispersed sources of particulate matter and other emissions from sources such as roadway dust, woodstoves, and open burning.

Best Available Control Technology (BACT) – The most up-to-date methods, systems, techniques, and production processes available to achieve the greatest feasible emission reductions for given regulated air pollutants and processes. BACT is a requirement of NSR (New Source Review) and PSD (Prevention of Significant Deterioration).

Best Available Retrofit Control Technology (BARCT) – An air emission limitation that applies to existing sources and is based on the maximum degree of reduction achievable, taking into account environmental, energy, and economic impacts by each class or category of source. (see also Best Available Control Technology.)

Best Management Practices (BMP) – Methods determined to be the most effective, practical means of preventing or reducing pollution.

Bikeway – A facility designed to accommodate bicycle travel for recreational or commuting purposes. Bikeways are not necessarily separated facilities; they may be designed to be shared with other travel modes.

Bike-and-Ride – Activity involving the use of a bicycle in conjunction with another type of transportation such as public transit. Typically, bike-and-ride facilities include bicycle storage areas adjacent to transit stops, giving transit riders the option of traveling to the stops without the use of a motorized vehicle.

Biodiesel – A renewable diesel fuel substitute that can be made by chemically combining a natural oil or fat with an alcohol. Many vegetable oils, animal fats, and recycled cooking greases can be transformed into biodiesel fuel. Biodiesel is a nontoxic, biodegradable fuel that has been proven to provide lower exhaust emissions.

Biogenic Source – Biological sources such as plants and animals that emit air pollutants such as volatile organic compounds. Examples of biogenic sources include animal management operations and oak and pine tree forests. (see also natural sources.)

Brown Cloud – A pollutant-related visibility problem is caused by tiny particles smaller than 10 microns in size, carbon-containing particles and the chemical reactions of certain gases, including NO_x, NH_3 and SO_2. The collective pollutants block light, causing the distinctive Brown Cloud and impeding visibility.

Build/No-build – Refers to conformity requirement during Interim and Transitional periods whereby Metropolitan Planning Organizations must demonstrate that "building" or implementing a long range plan (LRP) and Transportation Improvement Programs (TIPs) will provide more emissions reduction than "not building" or not implementing that same long range plan and TIP.

C

Cancer – A group of diseases characterized by uncontrolled invasive growth of body cells leading to the formation of malignant tumors that tend to grow rapidly and spread (i.e., metastasize).

Carbon Dioxide (CO_2) – A colorless, odorless gas that occurs naturally in the Earth's atmosphere. Significant quantities are also emitted into the air by fossil fuel combustion.

Carbon Monoxide (CO) – A colorless, odorless gas resulting from the incomplete combustion of hydrocarbon fuels. CO interferes with the blood's ability to carry oxygen to the body's tissues and results in numerous adverse health effects. Over 80% of the CO emitted in urban areas is contributed by motor vehicles. CO is a criteria air pollutant.

Carcinogen – A cancer-causing substance. (see also cancer.)

Carpool – An arrangement where two or more people share the use and cost of privately owned vehicles in traveling together to and from pre-arranged destinations. Carpools are not public transportation.

Catalyst – A substance that can increase or decrease the rate of a chemical reaction between the other chemical species without being consumed in the process.

Catalytic Converter – A motor vehicle pollution control device designed to reduce emissions such as oxides of nitrogen, hydrocarbons, and carbon monoxide.

Chlorofluorocarbons (CFCs) – These chemicals and some related chemicals have been used in great quantities in industry, for refrigeration and air conditioning, and in consumer products. CFCs and their relatives, when released into the air, rise into the stratosphere, a layer of the atmosphere high above the Earth. In the stratosphere, CFCs and their relatives take part in chemical reactions that result in reduction of the stratospheric ozone layer, which protects the Earth's surface from harmful effects of radiation from the sun. The 1990 Clean Air Act includes provisions for reducing releases (emissions) and eliminating production and use of these ozone-destroying chemicals.

Chronic Exposure – A long-term exposure, usually lasting one year to a lifetime.

Chronic Health Effect – A health effect that occurs over a relatively long period of time (e.g., months or years). (see also acute health effect.)

Clean Air Act – The original Clean Air Act was passed in 1963, but the national air pollution control program is actually based on the 1970 version of the law. The 1990 Clean Air Act Amendments are revisions of the 1970 law. Basic elements of the act include setting national ambient air quality standards for major air pollutants, mobile and

stationary control measures, air toxics standards, acid rain control measures, and enforcement provisions.

Cleaner-burning Gasoline – A mixture of gasoline that results in reduced emissions of carbon monoxide, nitrogen oxides, reactive organic gases, and particulate matter, in addition to toxic substances such as benzene and 1,3-butadiene.

Clean Fuels – Low-pollution fuels that can replace ordinary gasoline. These are alternative fuels, including gasohol (gasoline-alcohol mixtures), liquefied natural gas (LNG) and liquefied petroleum gas (LPG).

Collectors – In rural areas, routes serving intra-county, rather than statewide travel. In urban areas, streets providing direct access to neighborhoods as well as direct access to arterials.

Combustion – The act or instance of burning some type of fuel such as gasoline to produce energy. Combustion is typically the process that powers automobile engines and power plant generators.

Commute – Routine travel between home and a fixed location (e.g., work or school).

Commute Alternatives – Alternatives to single occupant vehicle travel to reduce vehicle miles traveled and/or trips to the work site. Examples may include carpooling, public transit, bicycling, vanpooling, telecommuting and compressed workweek.

Commuter(s) – A person or persons who travel regularly between home and work or home and school.

Compressed Natural Gas (CNG) – Natural gas that has been pressurized. It is held in a container (tank) and expands when released for use as a fuel.

Conformity – A demonstration of whether a federally supported activity is consistent with the State Implementation Plan (SIP) – per Section 176 (c) of the Clean Air Act. Transportation conformity refers to plans, programs, and projects approved or funded by the Federal Highway Administration or the Federal Transit Administration. General conformity refers to projects approved or funded by other federal agencies.

Conformity Finding – Verification that the emissions produced by transportation plans, programs, and projects are consistent with the air quality plans. Conformity is generally determined by either an emissions budget test or a build/no build test, and a demonstration that transportation control measures will be implemented in a timely fashion.

Conformity Lapse – The conformity determination for a transportation plan or TIP has expired, and thus there is no currently conforming transportation plan and TIP.

Congestion Management System (CMS) – ISTEA and TEA 21 require that each Transportation Management Area (see definition of TMA) develop a CMS that provides for effective management of new and existing transportation facilities through the use of travel demand reduction and operational management strategies. Unless a part of a CMS, future highway projects that significantly increase capacity for single occupant vehicles (SOVs) may be ineligible for federal funding.

Congestion Mitigation and Air Quality (Improvement Program) (CMAQ) – CMAQ is a TEA-21 program that funds projects and programs that reduce congestion and improve air quality in air quality nonattainment and maintenance areas for ozone (O_3), carbon monoxide (CO), and particulate matter (PM_{10}).

Consumer Products – Products such as hairspray, detergents, cleaning compounds, polishes, lawn and garden products, personal care products, and automotive specialty products which are part of our everyday lives and, through consumer use, may produce volatile organic air emissions which contribute to air pollution.

Continuous Emission Monitor (CEM) – A type of air emission monitoring system installed to operate continuously inside of a smokestack or other emission source. The 1990 Clean Air Act requires constant emission monitoring systems for certain large sources.

Continuous Sampling Device – An air analyzer that measures air quality components continuously. (see also Integrated Sampling Device.)

Contract Authority – A budgetary term that refers to a form of budget authority permitting obligations to be incurred in advance of appropriations. The Federal-Aid Highway Program operates mostly under contract authority rules.

Control Technology/Control Measures – Equipment, processes or actions used to reduce air pollution. The extent of pollution reduction varies among technologies and measures. In general, control technologies and measures that do the best job of reducing pollution are required in the areas with the worst pollution. For example, the best available control technology/best available control measures (BACT, BACM) are required in serious nonattainment areas for particulates, a criteria air pollutant. A similar high level of pollution reduction can be achieved with maximum achievable control technology (MACT) required for sources releasing hazardous air pollutants.

Control Techniques Guidelines (CTG) – Guidance documents issued by U.S. EPA that define reasonably available control technology (RACT) to be applied to existing facilities that emit excessive quantities of air pollutants; they contain information both on the economic and technological feasibility of available techniques.

Corridor – A broad geographical area that follows a general directional flow connecting major sources of trips that may contain a number of streets, highways and transit route alignments.

Corridor Studies – Typically, highway corridor studies focus on a segment of a particular travel corridor or travel shed. Land use, access issues, capacity, level of service, geometrics and safety concerns are studied; alternatives analyzed and recommendations made. Corridor studies are usually prepared with the participation and cooperation of the affected communities (see “Stakeholders”) and governmental agencies.

Cost-effectiveness – The cost of an emission control measure assessed in terms of dollars-per-pound, or dollars-per-ton, of air emissions reduced.

Council of Governments (COG) – A regional group with members from local governments from contiguous communities that meet on a regularly scheduled basis A COG is formed to cooperate on regional planning issues and to solve common development problems.

Criteria Air Pollutant – An air pollutant for which acceptable levels of exposure can be determined and for which an ambient air quality standard has been set. Examples include ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, and PM_{10} and $PM_{2.5}$. The term "criteria air pollutants" derives from the requirement that the U.S. EPA must describe the characteristics and potential health and welfare effects of these pollutants.

Cut – An excavation of the Earth's surface to provide passage for a transportation facility, road, railway, canal, etc.

D

Deciview – A measurement of visibility. One deciview represents the minimal perceptible change in visibility to the human eye.

Department of Transportation (DOT) – At the federal level, a cabinet agency with responsibility for highways, mass transit, aviation and ports; headed by the secretary of transportation. The DOT includes the Federal Highways Administration, the Federal Transit Authority and the Federal Aviation Administration, among others.

Deposit Control Additives – Substances added to motor vehicle fuel to reduce and prevent deposits in the fuel delivery system and engine intake valves.

Design Concept – The type of facility identified by the project, for example, freeway, expressway, arterial highway, grade-separated highway, reserved right-of-way rail transit, mixed-traffic rail transit, exclusive busway, etc.

Design Scope – Design aspects which will affect the proposed facility's impact on regional emissions, usually as they relate to vehicle or person carrying capacity and control.

Dial-a-Ride – A demand-responsive system providing door-to-door transportation to patrons who request service by telephone, either on an ad hoc or subscription basis.

Diesel Engine – A type of internal combustion engine that uses low-volatility petroleum fuel with fuel injectors and initiates combustion using compression ignition (as opposed to spark ignition that is used with gasoline engines).

Diesel Fuel – A fuel composed of distillates obtained in petroleum refining operation or blends of such distillates with residual oil used in motor vehicles. The boiling point and specific gravity are higher for diesel fuels than for gasoline.

Donut Area – The area outside of the FHWA approved adjusted boundary of one or more urbanized areas but within the boundary of a NAAQS non-attainment area.

Dose – The amount of a pollutant that is absorbed. The level of exposure is a function of a pollutant's concentration, the length of time a subject is exposed, and the amount of the absorbed pollutant. The concentration of the pollutant and amount of time the subject is exposed to the pollutant determine the dose.

Dose-response – The relationship between the dose of a pollutant and the response (or effect) it produces on a biological system.

Dust – Minute solid particles released into the air by natural forces or by mechanical processes such as crushing, grinding, milling, drilling, demolishing, shoveling, conveying, sweeping, etc.

Dust Devil – A small, intense vertical disturbance in which large volumes of dust and debris are carried upwards by the wind.

E

Electric Vehicle – A motor vehicle that uses an electric motor to operate and emits virtually no air pollutants. (see also hybrid electric vehicle.)

Electrostatic Precipitator (ESP) – An air pollution control device that removes particulate matter from an air stream by imparting an electrical charge to the particles for mechanical collection at an electrode.

Emission – This is the release of pollutants into the air from a source. Continuous emission monitoring systems (CEMS) which some large sources are required to install, to make continuous measurements of pollutant release.

Emission Factor – For stationary sources, the relationship between the amount of pollution produced and the amount of raw material processed or burned. For mobile sources, the relationship between the amount of pollution produced and the number of vehicle miles traveled. By using the emission factor of a pollutant and specific data regarding quantities of materials used by a given source, it is possible to compute emissions for the source. This approach is used in preparing an emissions inventory.

Emission Inventory – A complete list of the sources and amounts of pollutant emissions within a specific area and time interval.

Emission Offsets (also known as **Emissions Trading)** – A rule-making concept where the approval of a new or modified stationary source of air pollution is conditional on the reduction of emissions from another existing stationary source of air pollution. These reductions are required in addition to reductions required by best available control technology.

Emission Rate – The weight of a pollutant emitted per unit of time (e.g., tons/year).

Emission Standard – The maximum allowable amount of a pollutant that is discharged from a polluting source such as an automobile or smoke stack. All new vehicles for sale in the United States must be certified to meet either federal emissions standards, set by the U.S. Environmental Protection Agency (EPA), or California standards, set by the California Air Resources Board (CARB). These exhaust emissions standards limit the amounts of key pollutants coming from a vehicle's tailpipe and any leaks in its fuel system. California standards are progressively more stringent by pollutant. Specific standards are listed below:

> **Tier 1** (T1) – In place since 1994 for cars and trucks, these standards are the least stringent and are being replaced by Tier 2 standards.
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> **Tier 2** (T2) – New emission standards that will result in cars, minivans, sport utility vehicles (SUVs), and light-duty trucks that are 77-95% cleaner than those on the road today. Optional in model years 2001-2003, they are required to be phased in beginning in 2004. By 2009, all new cars and trucks must meet Tier 2 standards, which for the first time ever require minivans, SUVs, and light-duty trucks to meet the same emission standards as cars.
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> **Tier 3** (T3) – Tier 3 emission standards are more stringent standards for engines rated over 50 hp, phased in from 2006 to 2008
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> **Vehicle Emission Standards by Type**
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> **TLEV** – Transitional Low Emission Vehicle standards, which are more stringent than Tier 1 standards for hydrocarbons.

LEV – Low Emission Vehicle standards, which are more stringent than TLEV standards for both hydrocarbons and oxides of nitrogen.

PZEV – Partial Zero Emissions Vehicle, in addition to meeting stringent super-low tailpipe emissions (SULEV) the vehicle doesn't emit any evaporative emissions from the fuel system.

ULEV – Ultra Low Emission Vehicle standards, which are more stringent than LEV standards for hydrocarbons.

SULEV – Super Ultra Low Emission Vehicle standards, which are even more stringent than ULEV, for both hydrocarbons and oxides of nitrogen.

ZEV – Zero Emission Vehicle standard, which permits no vehicle level emissions.

Emissions Budget – The part of the State Implementation Plan (SIP) that identifies allowable emissions levels, mandated by the National Ambient Air Quality Standards, for certain pollutants emitted from mobile, stationary, and area sources. The emissions levels are used for meeting emission reduction milestones, attainment, or maintenance demonstrations.

Energy Content – The amount of energy available for doing work, i.e. the amount of energy in fuel available for powering a motor vehicle.

Enhancement Activities – Activities related to a particular transportation project that “enhance” or contributes to the existing or proposed project. Examples of such activities include provision of facilities for pedestrians or cyclists, landscaping or other scenic beautification projects, historic preservation, control and removal of outdoor advertising, archeological planning and research, and mitigation of water pollution due to highway runoff.

Enforcement – The legal methods used to make polluters obey the Clean Air Act. Enforcement methods include citations of polluters for violations of the law (citations are much like traffic tickets), fines and even jail terms. EPA, state, and local governments are responsible for enforcement of the Clean Air Act, but if they don't enforce the law, members of the public can sue EPA or the states to get action. Citizens can also sue violating sources, apart from any action EPA or state or local governments have taken. Before the 1990 Clean Air Act, all enforcement actions had to be handled through the courts. The Clean Air Act gave EPA authority so that, in some cases, EPA can fine violators without going to court first. The purpose of this new authority is to speed up violating sources' compliance with the law and reduce court time and cost.

Environmental Impact Statement (EIS) – A report which details any adverse economic, social, and environmental effects of a proposed transportation project for which federal funding is being sought. Adverse effects could include air, water, or noise pollution; destruction or disruption of natural resources; adverse employment effects; injurious displacement of people or businesses; or disruption of desirable community or regional growth.

Environmental Justice – The fair treatment of people of all races and incomes with respect to development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment implies that no person or group of people should shoulder a disproportionate share of negative environmental and economic impacts resulting from the execution of environmental programs.

Environmental Protection Agency (EPA) – Federal agency charged with protecting the environment.

Environmental Stewardship – A core business value that takes a proactive approach in balancing environmental protection and transportation development reflected in the policies and programs of the agency and the attitudes and work ethic of its employees.

Epidemiology – The study of the occurrence and distribution of disease within a population.

Ethanol – Ethyl alcohol, a volatile alcohol containing two carbon groups (CH_3CH_2OH). For fuel use, ethanol is produced by fermentation of corn or other plant products.

Evaporative Emissions – Emissions from evaporating gasoline that occur during vehicle refueling, vehicle operation, and even when the vehicle is parked. Evaporative emissions can account for two-thirds of the hydrocarbon emissions from gasoline-fueled vehicles on hot summer days.

Exhaust Gas Recirculation (EGR) – An emission control method that involves recirculating exhaust gases from an engine back into the intake and combustion chambers. This lowers combustion temperatures and reduces NO_X. (see also nitrogen oxides.)

Expected Peak Day Concentration (EPDC) – A calculated value that represents the concentration expected to occur at a particular site once per year, on average. The calculation procedure uses measured data collected at the site during a three-year period. Measured concentrations that are higher than the EPDC are excluded from the state area designation process.

Exceedance – A measured level of an air pollutant higher than the national or state ambient air quality standards. (see NAAQS.)

Exposure – The concentration of the pollutant in the air multiplied by the population exposed to that concentration over a specified time period.

Exposure Assessment – Measurement or estimation of the magnitude, frequency, duration and route of exposure to a substance for the populations of interest.

F

Federal-aid Highways – Those highways eligible for assistance under Title 23 U.S.C. except those functionally classified as local or rural minor collectors

Federal Highway Administration (FHWA) – Division of the U.S. Department of Transportation that funds highway planning and programs.

Federal Implementation Plan (FIP) – In the absence of an approved State Implementation Plan (SIP), a plan prepared by the U.S. EPA to provide measures that nonattainment areas must take to meet the requirements of the Federal Clean Air Act.

Federal Transit Administration (FTA) – Division of the U.S. Department of Transportation that funds transit planning and programs.

Fiscal Year – The annual schedule for keeping financial records and budgeting transportation funds. ADOTs fiscal year runs from July 1 through June 30, while the federal fiscal year runs from Oct. 1 through Sept. 30.

Flexible Fuel Vehicle (FFV) – Vehicles that can use a combination of fuels such as alcohol fuel and unleaded gasoline.

Flexible Funds – Federal funds which may be used for highway, transit or other transportation projects, as decided by regional metropolitan planning organizations (MPOs) and state governments. Examples of flexible funds include the Surface Transportation Program (STP) and the Congestion Mitigation and Air Quality (CMAQ).

Fossil Fuels– Fuels such as coal, oil, and natural gas; so-called because they are the remains of ancient plant and animal life.

Fuel Cell – An electrochemical cell that captures the electrical energy of a chemical reaction between fuels such as liquid hydrogen and liquid oxygen and converts it directly and continuously into the energy of a direct electrical current.

Fugitive Dust – Dust particles that are introduced into the air through certain activities such as soil cultivation, or vehicles operating on open fields or dirt roadways. Fugitive dust is a subset of fugitive emissions.

Fugitive Emissions – Emissions not caught by a capture system that are often due to equipment leaks, evaporative processes, and windblown disturbances.

Fume – Solid particles under 1 micron in diameter formed as vapors condense, or as chemical reactions take place.

Furnace – A combustion chamber; an enclosed structure in which fuel is burned to heat air or material.

G

Gasohol – An alternative motor fuel that is a blend of 90% ordinary gasoline and 10% ethanol fermented from biomass (e.g., corn). It can be used interchangeably with gasoline in conventional cars.

Gas Turbine – An engine that uses a compressor to draw air into the engine and compress it. Fuel is added to the air and combusted in a cumbustor. Hot combustion gases exiting the engine turn a turbine that also turns the compressor. The engine's power output can be delivered from the compressor or turbine side of the engine.

Gasoline Volatility – The evaporative properties of gasoline. Gasoline vapor is a volatile organic compound. (see also VOC and Reid Vapor Pressure.)

Geographic Information Systems (GIS) – A computer system that can spatially manage, analyze and present geographic data. Road maps show simple kinds of data like town names, highway routes and rivers. These data are tied to a particular location or "geo-referenced." GIS uses computers to greatly extend the data tied to locations and allows users to create customized maps and analyze patterns and relationships. Among the geo-referenced data sources are TIGER/Line files from the U.S. Census used to map all roads, transit lines and other transportation facilities.

Global Warming – An increase in the temperature of the Earth's troposphere. Global warming has occurred in the past as a result of natural influences, but the term is most often used to refer to the warming predicted by computer models to occur as a result of increased emissions of greenhouse gases.

Greenhouse Effect – The warming effect of the Earth's atmosphere. Light energy from the sun that passes through the Earth's atmosphere is absorbed by the Earth's surface and re-radiated into the atmosphere as heat energy. The atmosphere then traps the heat energy, creating a situation similar to that which occurs in a car with its windows rolled up. A number of scientists believe that the emission of CO_2 and other gases into the atmosphere may increase the greenhouse effect and contribute to global warming.

Greenhouse Gases – Atmospheric gases such as carbon dioxide, methane, chlorofluorocarbons, nitrous oxide, ozone, and water vapor that slow the passage of re-radiated heat through the Earth's atmosphere.

H

Hazardous Air Pollutant (HAP) – An air pollutant listed under section 112 (b) of the federal Clean Air Act as particularly hazardous to health. U.S. EPA identifies emission sources of hazardous air pollutants, and emission standards are set accordingly. Hazardous air pollutants are released by sources such as chemical plants, dry cleaners, printing plants, and motor vehicles (cars, trucks, buses, etc.)

Haze (Hazy) – A phenomenon that results in reduced visibility due to the scattering of light caused by aerosols. Haze is caused in large part by man-made air pollutants.

Health-based Standard (Primary Standard) – A dosage of air pollution scientifically determined to protect against human health effects such as asthma, emphysema, and cancer.

Health Risk Assessment (HRA) – A document that identifies the risks and quantities of possible adverse health effects that may result from exposure to emissions of toxic air contaminants. A health risk assessment cannot predict specific health effects; it only describes the increased possibility of adverse health effects based on the best scientific information available.

High Occupancy Vehicle (HOV), Bus, and Carpool Lanes – A form of preferential treatment in which lanes on streets or highways are restricted for the exclusive use of high-occupancy vehicles during at least a portion of the day. These lanes are officially denoted with a diamond marking and are sometimes called "diamond lanes."

Highway Performance Monitoring System (HPMS) – The State/Federal system used by the FHWA to provide information on the extent and physical condition of the nation's highway system, its use, performance, and needs. The system includes an inventory of the nation's highways including traffic volumes.

Highway User Revenue Fund (HURF) – A state fund that is used primarily to pay for maintenance and improvements to state highways, city streets and county roads. HURF revenues come primarily from state fuel taxes, motor carrier registration fees, and vehicle license tax and registration fees.

Hot-spot Analysis – An estimation of likely future localized CO and PM_{10} pollutant concentrations and a comparison of those concentrations to the NAAQS, particularly polluted or high-emission areas or intersections.

Hybrid Electric Vehicle (HEV) – Hybrid electric motor vehicles may operate using both electric and gasoline-powered motors. Emissions from hybrid electric motor vehicles are

also substantially lower than conventionally powered motor vehicles. (see also Electric Motor Vehicle.)

Hydrocarbons – A precursor of ozone in addition to oxides of nitrogen (NO_X). Hydrocarbons are also known as Volatile Organic Compounds (VOC) or Reactive Organic Gases (ROG). They may be emitted into the air by natural sources (e.g., trees) and as a result of fossil and vegetative fuel combustion, fuel volatilization, and solvent use. Hydrocarbons are a major contributor to smog.

Hydrogen Sulfide (H_2S) – A colorless, flammable, poisonous compound having a characteristic rotten-egg odor. It is used in industrial processes and may be emitted into the air.

I

Incremental Reactivity (IR) – The additional ozone formed in the atmosphere with the incremental addition of a certain amount of a volatile organic compound.

Incineration – The act of burning a material to ashes.

Increase the Frequency or Severity – To cause a location or region to exceed a standard more often or to cause a violation at a greater concentration than previously existed and/or would otherwise exist during the future period in question, if the project were not implemented.

Indirect Source – Any facility, building, structure, or installation, or combination thereof, which generates or attracts mobile source activity that results in emissions of any pollutant (or precursor) for which there is a state ambient air quality standard. Examples of indirect sources include employment sites, shopping centers, sports facilities, housing developments, airports, commercial and industrial development, and parking lots and garages.

Individual Cancer Risk – The probability, expressed as chances in a million, that a person experiencing 70 years of continuous area-wide outdoor exposure to a toxic air contaminant will develop cancer.

Indoor Air Pollution – Air pollutants that occur within buildings or other enclosed spaces, as opposed to those occurring in outdoor or ambient air. Some examples of indoor air pollutants are nitrogen oxides, smoke, asbestos, formaldehyde, and carbon monoxide.

Industrial Source – Any of a large number of sources—such as manufacturing operations, oil and gas refineries, food processing plants, and energy generating facilities – that emit substances into the atmosphere.

Inert Gas – A gas that does not react with the substances coming in contact with it.

Inspection Program – A motor vehicle inspection program implemented by the Motor Vehicle Division (MVD) of ADOT. The purpose of the program is to reduce emissions by assuring that cars are running properly. It is designed to identify vehicles in need of maintenance and to assure the effectiveness of their emission control systems on a biennial basis.

Integrated Sampling Device – An air sampling device that allows estimation of air quality components over a period of time through laboratory analysis of the sampler's medium. (see also Continuous Sampling Device.)

Intelligent Transportation Systems (ITS) – Use of computer and communications technology to facilitate the flow of information between travelers and system operators. Includes concepts such as "freeway management systems," "automated fare collection," and "transit information kiosks."

Intermodal (multimodal) – Issues or activities involving or affecting more than one mode of transportation, including transportation connections, choices, cooperation and coordination of various modes.

Intermodal Surface Transportation Efficiency Act (ISTEA) – Pronounced "Ice Tea," this federal legislation was signed into law by the U.S. Congress in 1991. ISTEA restructured funding for transportation programs, authorized increased levels of highway and transportation funding, and an enlarged role for regional planning commissions/MPOs in funding decisions. The Act requires comprehensive regional long-range transportation plans extending to the year 2015 and places an increased emphasis on public participation and transportation alternatives.

Internal Combustion Engine – An engine where both heat energy and the ensuing mechanical energy are produced inside the engine. Includes gas turbines, spark ignition gas, and compression ignition diesel engines.

International Air Pollution – Canada and Mexico, the United States' neighbors, share the air at our borders. Pollution moves across the national borders and can be serious. The 1990 Clean Air Act includes provisions for cooperative efforts to reduce pollution that originates in one country and affects another.

Interstate Air Pollution – In many areas, two or more states share the same air and are in the same air basin defined by geography and wind patterns. Often, air pollution moves out of the state in which it is produced into another state. Some pollutants, such as the power plant combustion products that cause acid rain, may travel over several states before affecting health, the environment and property. The 1990 Clean Air Act includes many provisions, such as interstate compacts, to help states work together to protect the air they share. Reducing interstate air pollution is very important since many Americans live and work in areas where more than one state is part of a single metropolitan area.

Interstate Highway System – This system is part of the Federal Aid Primary system. It is a system of freeways connecting and serving the principal cities of the continental United States.

Inversion – A layer of warm air in the atmosphere that prevents the rise of cooling air and traps pollutants beneath it. Inversion prevents the rise of pollutants that might otherwise be dispersed.

J

Joint Project Agreement (JPA) – JPA are used as a way to provide an exchange of funds between the ADOT and other agencies or organizations, or to memorialize in writing any agreement of the parties. Joint Project Agreements (JPA) and Private Sector Agreements (PSA) are essentially the same and carry the same statutory requirements as an Intergovernmental Agreement (IGA).

K

Kiss and Ride – A place where commuters are driven and dropped off at a station to board a public transportation vehicle.

L

Land Use – The use of land or the structures on it, e.g., residential, commercial, industrial, etc.

Latest Planning Assumptions – A conformity determination must be based upon the most recent planning assumptions in force at the time the conformity determination is made. The conformity determination must be derived from the estimates of current and future population, employment, travel, and congestion most recently developed by the MPO or other agency authorized to make such estimates and approved by the MPO and other assumptions as found in CFR § 93.110.

Lead (Pb) – A gray-white metal that is soft, malleable, ductile, and resistant to corrosion. Sources of lead resulting in concentrations in the air include industrial sources and crustal weathering of soils followed by fugitive dust emissions. Health effects from exposure to lead include brain and kidney damage and learning disabilities. Lead is the only substance that is currently listed as both a criteria air pollutant and a toxic air contaminant.

Light-duty Vehicle (LDV) – Any motor vehicle with a gross vehicle weight of 6000 pounds or less.

Light rail transit (LRT) – An electrically propelled vehicle operated singly or in trains on predominantly reserved, but not necessarily grade-separated, rights-of-way.

Limit of Detection (LOD) – The lowest concentration of a substance that can reliably measured.

Liquefied Natural Gas (LNG) – (see Alternative Fuels.)

Liquefied Petroleum Gas (LPG) – (see Alternative Fuels.)

Local Roads – Roads and streets whose principal function is to provide direct access to abutting land.

Long-range Transport of Air Pollutants (LRTAP) –The atmospheric transport of air pollutants within a moving air mass for a distance greater than 60 miles (100 kilometers).

Long Term – In transportation planning, refers to a time span of, generally, 20 years. The transportation plan for metropolitan areas and for States should include projections for land use, population, and employment for the 20-year period.

Low Emission Vehicle (LEV) – A vehicle that meets emission vehicle standards.

Lowest Achievable Emission Rate (LAER) – Under the Clean Air Act, the rate of emissions that reflects (1) the most stringent emission limitation in the State Implementation Plan of any state for a given source unless the owner or operator

demonstrates such limitations are not achievable; or (2) the most stringent emissions limitation achieved in practice, whichever is more stringent.

M

Maintenance Area - Any geographic region designated nonattainment pursuant to the Clean Air Act and subsequently redesignated to attainment subject to the requirement to develop a maintenance plan.

Major Source – A stationary facility that emits a regulated pollutant in an amount exceeding the threshold level depending on the location of the facility and attainment with regard to air quality status. (see Source.)

Management Systems – Six systems originally required under ISTEA to improve identification of problems and opportunities throughout the entire surface transportation network, and to evaluate and prioritize alternative strategies, actions and solutions. The six management systems include Pavement Management System (PMS), Bridge Management System (BMS), Highway Safety Management System (HSMS), Congestion Management System (CMS), Public Transit Facilities and Equipment Management System (PTMS) and Intermodal Management System (IMS).

Material Safety Data Sheets (MSDS) – product safety information sheets prepared by manufacturers and marketers of products containing toxic chemicals. These sheets can be obtained by requesting them from the manufacturer or marketer. Some stores, such as hardware stores, may have material safety data sheets on hand for products they sell.

Maximum Achievable Control Technology (MACT) – Federal emissions limitations based on the best demonstrated control technology or practices in similar sources to be applied to major sources emitting one or more federal hazardous air pollutants.

Maximum Incremental Reactivity (MIR) – A measure of the increase in ozone formation per unit weight of a hydrocarbon when added to the atmosphere.

Mean – The sum of all the measurements in a data set divided by the number of measurements in the data set.

Median – The middle value in a population distribution, above and below which lie an equal number of individual values; midpoint.

Memoranda of Understanding (MOU): A contract between ADOT and other participating organizations that specifies each organization’s responsibilities regarding mutual goals or projects. An MOU itself is not legally binding, although it may reflect statuary obligations that are legally enforceable.

Mesosphere – The layer of the Earth's atmosphere above the stratosphere and below the thermosphere. It is between 35 and 60 miles from the Earth.

Methyl Tertiary Butyl Ether (MTBE) – An ether compound added to gasoline to provide oxygen and enhance complete combustion.

Metropolitan Planning Organization (MPO) – The organizational entity designated by law with lead responsibility for developing transportation plans and programs for urbanized areas of 50,000 or more in population. MPOs are established by an

agreement of the Governor and units of local government, which represent 75 percent of the affected population or an urbanized area.

Miscible – Capable of being mixed with other substances.

Mobile Sources – Moving objects that release pollution. Mobile Sources of air pollution such as cars, trucks, buses, planes, trains, motorcycles and gasoline-powered lawn mowers. Mobile sources are divided into two groups road vehicles, which includes cars, trucks and buses, and non-road vehicles, which includes trains, planes and lawn mowers. (see also stationary sources).

Modal Split –

1. The proportion of total person trips that uses each of various specified modes of transportation.
2. The process of separating total person trips into the modes of travel used.
3. A term that describes how many people use alternative forms of transportation. It is frequently used to describe the percentage of people who use private automobiles, as opposed to the percentage who user public transportation.

Mode – The value in the data set that occurs most frequently.

Mode, Intermodal, Multimodal – Form of transportation, such as automobile, transit, bicycle and walking. Intermodal refers to the connections between modes and multimodal refers to the availability of transportation options within a system or corridor.

Model – A mathematical and geometric projection of activity and the interactions in the transportation system in an area. This projection must be able to be evaluated according to a given set of criteria typically including criteria pertaining to land use, economics, social values, and travel patterns.

Monitoring – The periodic or continuous sampling and analysis of air pollutants in ambient air or from individual pollution sources. The 1990 Clean Air Act requires certain large polluters to perform enhanced monitoring to provide an accurate picture of their pollutant releases. Enhanced monitoring programs may include keeping records on materials used by the source, periodic inspections, and installation of continuous emission monitoring systems (CEMS). The Clean Air Act requires states to monitor community air in polluted areas to check on whether the areas are being cleaned up according to schedules set out in the law.

Morbidity – Rate of disease incidence.

Mortality – Death rate.

Multimedia Exposure – Exposure to a toxic substance from multiple pathways such as air, water, soil, food, and breast milk.

Mutagenic – The ability of a chemical or physical agent to produce heritable changes in the DNA of living cells.

N

National Ambient Air Quality Standards (NAAQS) – Standards established by the United States EPA that apply for outdoor air throughout the country. There are

two types of NAAQS. Primary standards set limits to protect public health and secondary standards set limits to protect public welfare.

National Emission Standards for Hazardous Air Pollutants (NESHAPS) – Emissions standards set by the U.S. EPA for a hazardous air pollutant, such as benzene, which may cause an increase in deaths or in serious, irreversible, or incapacitating illness.

National Environmental Policy Act of 1969 (NEPA) – A comprehensive federal law requiring analysis of the environmental impacts of federal actions such as the approval of grants; also requiring preparation of an Environmental Impact Statement (EIS) for every major federal action significantly affecting the quality of the human environment.

National Highway Systems (NHS) – A federal transportation program originally authorized by ISTEA that designates nationally significant interstate and roads for interstate travel, national defense, intermodal connections, and international commerce. Other eligible activities include bikeways and park-and-ride lots.

National Transportation System (NTS) – An intermodal system consisting of all forms of transportation in a unified, interconnected manner to reduce energy consumption and air pollution while promoting economic development and supporting the nation's preeminent position in international commerce. The NTS includes the National Highway System (NHS), public transportation and access to ports and airports.

Natural Gas – A mixture of hydrocarbon compounds and small quantities of various nonhydrocarbons existing in the gaseous phase or in solution with crude oil in natural underground reservoirs.

Natural Sources – Non-manmade emission sources, including biological and geological sources, wildfires, and windblown dust.

New Source Performance Standards (NSPS) – Uniform national EPA air emission standards that limit the amount of pollution allowed from new sources or from modified existing sources.

New Source Review (NSR) – A Clean Air Act requirement that State Implementation Plans must include a permit review, which applies to the construction and operation of new and modified stationary sources in nonattainment areas, to ensure attainment of national ambient air quality standards. The two major requirements of NSR are Best Available Control Technology and Emission Offsets.

Nitric Oxide (NO) – Precursor of ozone, NO_2, and nitrate; nitric oxide is usually emitted from combustion processes. Nitric oxide is converted to nitrogen dioxide (NO_2) in the atmosphere, and then becomes involved in the photochemical processes and/or particulate formation. (see Nitrogen Oxides.)

Nitrogen Oxides (Oxides of Nitrogen, NO_X) – A general term pertaining to compounds of nitric oxide (NO), nitrogen dioxide (NO_2), and other oxides of nitrogen. Nitrogen oxides are typically created during combustion processes, and are major contributors to smog formation and acid deposition. NO_2 is a criteria air pollutant, and may result in numerous adverse health effects.

Nonattainment Area – A geographic area in which the level of a criteria air pollutant is higher than the level allowed by the federal standards. A single geographic area may have acceptable levels of one criteria air pollutant but unacceptable levels of one or more other criteria air pollutants; thus, an area can be both attainment and

nonattainment at the same time. It has been estimated that 60% of Americans live in nonattainment areas.

Nonattainment, Transitional – A subcategory of the nonattainment designation category for state standards that signals progress and implies the area is nearing attainment. Districts with nonattainment-transitional status may revise their attainment plans to delay adoption of control measures anticipating attainment without the measures.

Non-carcinogenic Effects – Non-cancer health effects that may include birth defects, organ damage, morbidity, and death.

Non-Compliance – A region is said to be in "non-compliance" when hourly measurements of air pollution in that region exceed those designated to be safe by the Federal Clean Air Act.

Non-industrial Source – Any of a large number of sources – such as mobile, area-wide, indirect, and natural sources – which emit substances into the atmosphere.

Non-methane Hydrocarbon (NMHC) – The sum of all hydrocarbon air pollutants except methane. NMHCs are significant precursors to ozone formation.

Non-methane Organic Gas (NMOG) – The sum of non-methane hydrocarbons and other organic gases such as aldehydes, ketones, and ethers.

Nonpoint Sources – Diffuse pollution sources that are not recognized to have a single point of origin.

Nonroad Emissions – Pollutants emitted by a variety of nonroad sources such as farm and construction equipment, gasoline-powered lawn and garden equipment, portable generators, and powerboats and outboard motors. Also referred to as "off-road" or "off-highway,"

No-Observed-Adverse-Effect-Level (NOAEL) – A term used in risk assessment. An exposure level at which there are no statistically or biologically significant increases in the frequency or severity of adverse effects between an exposed population and a comparable non-exposed population.

No-Observed-Effect-Level (NOEL) – A term used in risk assessment. An exposure level at which there are no statistically or biologically significant difference or severity of an effect between an exposed population and a comparable non-exposed population.

O

Obligation – A federal budgetary term that refers to a binding agreement that will result in an outlay; an agreement by the federal government to pay for goods or services immediately or at some future time when the goods or services are delivered. Also known as a "commitment".

Octane Number – A numerical measure of the antiknock properties of gasoline used as a motor fuel. The higher the octane number, the greater the antiknock properties.

Offset – A method used in the 1990 Clean Air Act to give companies that own or operate large (major) sources in nonattainment areas flexibility in meeting overall pollution reduction requirements when changing production processes. If the owner or

operator of the source wishes to increase release of a criteria air pollutant, an offset (reduction of a somewhat greater amount of the same pollutant) must be obtained either at the same plant or by purchasing offsets from another company.

Onboard Diagnostics – Devices incorporated into the computer systems of new motor vehicles to monitor components and systems that affect emissions when malfunctioning. If a problem is detected, the OBD system illuminates a warning lamp on the vehicle instrument panel to alert the driver. This warning lamp typically contains the phrase “Check Engine” or “Service Engine Soon”. The system also stores important information about the detected malfunction so that a repair technician can accurately find and fix the problem.

Onboard Vapor Recovery – Devices placed on vehicles to capture gasoline vapor during refueling and then route the vapors to the engine when the vehicle is started so that they can be efficiently burned.

Onroad Source – All vehicles that are driven on roadways.

Opacity – The amount of light obscured by particle pollution in the atmosphere. Opacity is used as an indicator of changes in performance of particulate control systems.

Operating Revenues – Monies used to fund general, day-to-day costs of running transportation systems. For transit, costs include fuel, salaries and replacement parts; for highways, operating costs involve maintaining pavement, repairing guardrails, paying workers' salaries, and so forth.

Organic Compounds – A large group of chemical compounds containing mainly carbon, hydrogen, nitrogen, and oxygen. All living organisms are made up of organic compounds.

Oxidant – A substance that brings about oxidation in other substances. Oxidizing agents (oxidants) contain atoms that have suffered electron loss. In oxidizing other substances, these atoms gain electrons. Ozone, which is a primary component of smog, is an example of an oxidant.

Oxidation – The chemical reaction of a substance with oxygen or a reaction in which the atoms in an element lose electrons and its valence is correspondingly increased.

Oxygenate – An organic molecule that contains oxygen. Oxygenates are typically ethers and alcohols.

Oxygenated Fuel (oxyfuel) – A special type of gasoline that contains a higher oxygen content than regular gasoline, and which burns more completely than regular gasoline in cold start conditions; more complete burning results in reduced production of carbon monoxide.

Ozone – A strong smelling, pale blue, reactive toxic chemical gas consisting of three oxygen atoms. It is a product of the photochemical process involving the suns energy and ozone precursors, such as hydrocarbons and oxides of nitrogen. Ozone exists in the upper atmosphere ozone layer (stratospheric ozone) as well as at the Earth's surface in the troposphere (ozone). Stratospheric ozone shields the Earth against harmful rays from the sun, particularly ultraviolet B. Ozone in the troposphere causes numerous adverse health effects and is a criteria air pollutant. It is a major component of smog.

Ozone Depletion – The reduction in the stratospheric ozone layer. Stratospheric ozone shields the Earth from ultraviolet radiation. The breakdown of certain chlorine and/or

bromine-containing compounds that catalytically destroy ozone molecules in the stratosphere can cause a reduction in the ozone layer.

Ozone-Forming Potential – (see Reactivity.)

Ozone Hole – thin place in the ozone layer located in the stratosphere high above the Earth. Stratospheric ozone thinning has been linked to destruction of stratospheric ozone by CFCs and related chemicals. The 1990 Clean Air Act has provisions to reduce and eliminate ozone-destroying chemicals' production and use. Ozone holes have been found above Antarctica and above Canada and northern parts of the United States, as well as above northern Europe.

Ozone Precursors – Chemicals such as non-methane hydrocarbons and oxides of nitrogen occurring either naturally or as a result of human activities, which contribute to the formation of ozone, a major component of smog.

Ozone Season – That period of the year during which long days, little cloud cover, and warm temperatures make conditions favorable for ozone formation.

Paratransit – A variety of smaller, often flexibly scheduled-and- routed transportation services using low-capacity vehicles, such as vans, to operate within normal urban transit corridors or rural areas. These services usually serve the needs of persons that standard mass-transit services would serve with difficulty, or not at all. Often, the patrons include the elderly and persons with disabilities.

Park-and-Ride – An access mode to transit in which patrons drive private vehicles or ride bicycles to a transit station, bus or rail stop or carpool or vanpool waiting area and park their vehicles in the area provided for the purpose. They then ride the transit system or take the carpool/vanpool to their destinations.

Particulate Matter (PM) – Any material, except pure water, that exists in the solid or liquid state in the atmosphere. The size of particulate matter can vary from coarse, wind-blown dust particles to fine particle combustion products.

Parts Per Million (PPM) – The number of parts of a given pollutant in a million parts of air.

Peak Levels – A level of airborne pollutants that is much higher than average. They can occur over a short period of minutes or hours in response to sudden releases or due to a longer-term build-up over several days.

Permit – Written authorization from a government agency that allows for the construction and/or operation of an emissions generating facility or its equipment within certain specified limits. They are required by the Clean Air Act for big (major) sources of air pollution, such as power plants, chemical factories and, in some cases, smaller polluters. Usually permits will be given out by states, but if EPA has disapproved part or all of a state permit program, the EPA will give out the permits in that state. The 1990 Clean Air Act includes requirements for permit applications, including provisions for members of the public to participate in state and EPA reviews of permit applications. Permits will have, in one place, information on all the regulated pollutants at a source. Permits include information on which pollutants are being released, how much the source is allowed to release, and the program that will be used to meet pollutant release

requirements. Permits are required both for the operation of plants (operating permits) and for the construction of new plants. The Clean Air Act introduced a nationwide permit system for air pollution control.

Permit Fees – Fees paid by businesses required to have a permit. Permit fees are like the fee drivers pay to register their cars. The money from permit fees will help pay for state air pollution control activities.

Peroxyacytal Nitrate (PAN) – A group of compounds formed from the photochemical reactions of nitrogen and organic compounds. PANs are components of smog and known to cause eye irritation.

Persistence – Refers to the length of time a compound remains in the atmosphere once introduced. A compound may persist for less than a second or indefinitely.

Personal Watercraft (PWC) – A watercraft that does not have outboard, inboard, or stern drive engines. This encompasses the watercraft typically referred to as Jet Skis, Waverunners, etc.

Photochemical Reaction – A term referring to chemical reactions brought about by the light energy of the sun. The reaction of nitrogen oxides with hydrocarbons in the presence of sunlight to form ozone is an example of a photochemical reaction.

Plume – A visible or measurable discharge of a contaminant from a given point of origin that can be measured according to the Ringelmann scale. (see Ringelmann Chart.)

$PM_{2.5}$ – Includes tiny particles with an aerodynamic diameter less than or equal to a nominal 2.5 microns. This fraction of particulate matter penetrates most deeply into the lungs.

PM_{10} (Particulate Matter) – A criteria air pollutant consisting of small particles with an aerodynamic diameter less than or equal to a nominal 10 microns (about 1/7 the diameter of a single human hair). Their small size allows them to make their way to the air sacs deep within the lungs where they may be deposited and result in adverse health effects. PM_{10} also causes visibility reduction. PM_{10}s include dust, soot and other tiny bits of solid materials that are released into and move around in the air. Particulates are produced by many sources, including burning of diesel fuels by trucks and buses, incineration of garbage, mixing and application of fertilizers and pesticides, road construction, industrial processes such as steel making, mining operations, agricultural burning (field and slash burning), and operation of fireplaces and woodstoves. Particulate pollution can cause eye, nose and throat irritation and other health problems.

Point Source – Specific points of origin where pollutants are emitted into the atmosphere such as factory smokestacks. (see also Area-Wide Sources and Fugitive Emissions.)

Pollutant – Generally, any substance introduced into the environment that adversely effects the usefulness of a resource. Pollutants can harm health, the environment and property. Many air pollutants occur as gases or vapors, but some are very tiny solid particles dust, smoke or soot.

Pollutant Standards Index (PSI) – A numerical index formerly used for reporting severity of air pollution levels to the general public. The PSI incorporated the five criteria pollutants – ozone, PM_{10}, carbon monoxide, sulfur dioxide, and nitrogen dioxide – into one single index. The PSI was based on the 1-hour ozone standard. PSI levels ranged

from 0 (Good air quality) to 500 (Hazardous air quality). The higher the index, the higher the level of pollutants and the greater likelihood of health effects.

Pollution Prevention – The use of materials, processes, or practices to reduce, minimize, or eliminate the creation of pollutants or wastes. It includes practices that reduce the use of toxic or hazardous materials, energy, water, and/or other resources.

Polycyclic Aromatic Hydrocarbons (PAHs) – Organic compounds which include only carbon and hydrogen with a fused ring structure containing at least two benzene (six-sided) rings. PAHs may also contain additional fused rings that are not six-sided. The combustion of organic substances is a common source of atmospheric PAHs.

Positive Crankcase Ventilation (PCV) – An emission control system for a reciprocating internal combustion engine that involves recirculating gases that blow by the piston rings during combustion from the crankcase back into the intake manifold so they can be more completely burned.

Precipitator – Pollution control device that collects particles from an air stream. (see Electrostatic Precipitator.)

Prescribed Burning – The planned application of fire to vegetation to achieve any specific objective on lands selected in advance of that application.

Prevention of Significant Deterioration (PSD) – A program used in development of permits for new or modified industrial facilities in an area that is already in attainment. The intent is to prevent an attainment area from becoming a nonattainment area. This program, like NSR, can require BACT and, if the NAAQS is projected to be exceeded, Emission Offsets.

Primary Standard – Primary standards are pollution limits set for criteria air pollutants, based on health effects.

Primary Particles – Particles that are directly emitted from combustion and fugitive dust sources. (Compare with Secondary Particle.)

Propellant – A gas with a high vapor pressure used to force formulations out of aerosol spray cans. Among the gases used are butanes, propanes and nitrogen.

Public Participation – The active and meaningful involvement of the public in the development of transportation plans and programs.

Public Transportation (transit, mass transit, mass transportation) – Transportation by bus, rail, or other conveyance, either publicly or privately owned, providing to the public general or special service (but not including school buses or charter or sightseeing service) on a regular and continuing basis.

Public Workshop – A workshop held by a public agency for the purpose of informing the public and obtaining its input on the development of a regulatory action or control measure by that agency.

Reactive Organic Gas (ROG) – A photochemically reactive chemical gas,

composed of non-methane hydrocarbons that may contribute to the formation of smog. Also sometimes referred to as Non-Methane Organic Gases (NMOGs). (see also Volatile Organic Compounds and Hydrocarbons.)

Reactivity (or Hydrocarbon Photochemical Reactivity) – A term used in the context of air quality management to describe a hydrocarbon's ability to react (participate in photochemical reactions) to form ozone in the atmosphere. Different hydrocarbons react at different rates. The more reactive a hydrocarbon, the greater potential it has to form ozone.

Reasonably Available Control Measures (RACM) – Broadly defined terms referring to technologies and other measures that can be used to control pollution. They include Reasonably Available Control Technology and other measures. In the case of PM_{10}, RACM refers to approaches for controlling small or dispersed source categories such as road dust, woodstoves, and open burning.

Reasonably Available Control Technology (RACT) – Control techniques defined in U.S. EPA guidelines for limiting emissions from existing sources in nonattainment areas. Racist are adopted and implemented by states. RACTs are reasonably available and both technologically and economically feasible.

Reasonably Available Retrofit Control Technology (RARCT) – (see Best Available Control Technology.)

Reciprocating Internal Combustion Engine – An engine in which air and fuel are introduced into cylinders, compressed by pistons, and ignited by a spark plug or by compression. Combustion in the cylinders pushes the pistons sequentially, transferring energy to the crankshaft, causing it to rotate.

Reference Dose (RfD) – An estimate delivered by the U.S. EPA (with uncertainty spanning perhaps an order of magnitude) of the daily exposure to the human population, (including sensitive subpopulations) that is likely to be without deleterious effects during a lifetime. The RfD is reported in units of mg of substance/kg body weight/day for oral exposures.

Reference Exposure Concentration (RfC) – An estimate, derived by the U.S. EPA with an uncertainty spanning perhaps an order of magnitude) of a daily exposure to the human population, (including sensitive subgroups) that is likely to be without appreciable risk of deleterious effects during a lifetime of exposure. The RfC is derived from a no or lowest observed adverse effect level from human or animal exposures, to which uncertainty or "safety" factors are applied.

Reference Exposure Level (REL) – A term used in risk assessment. It is the concentration at or below which no adverse health effects are anticipated for a specified exposure period.

Reformulated Gasoline (RFG) – Also called Cleaner Burning Gasoline (CBG). Gasoline with a different composition from conventional gasoline (e.g., lower aromatics content) that results in the production of lower levels of air pollutants. The 1990 Clean Air Act requires sale of reformulated gasoline in the nine smoggiest areas. Reformulated gasoline was sold in several smoggy areas even before the Clean Air Act was passed.

Reformulated Gasoline Predictive Model – A set of mathematical equations that predict the emissions likely to occur from the combustion of a given formulation of gasoline.

Regional Haze – The haze produced by a multitude of sources and activities that emit fine particles and their precursors across a broad geographic area. National regulations require states to develop plans to reduce the regional haze that impairs visibility in national parks and wilderness areas.

Regionally Significant Project – A transportation project (other than an exempt project) that is on a facility which serves regional transportation needs (such as access to and from the area outside of the region, major activity centers in the region, major planned developments such as new retail malls, sports complexes, etc., or transportation terminals as well as most terminals themselves) and would normally be included in the modeling of a metropolitan area's transportation network, including at a minimum all principal arterial highways and all fixed guideway transit facilities that offer an alternative to regional highway travel.

Reid Vapor Pressure – Refers to the vapor pressure of the fuel expressed in the nearest hundredth of a pound per square inch (psi) with a higher number reflecting more gasoline evaporation. (see also Gasoline Volatility.)

Residual Risk – The quantity of health risk remaining after application of emission control.

Reverse Commuting – Movement in a direction opposite the main flow of traffic, such as from the central city to a suburb during the morning peak period.

Ridesharing – A form of transportation, other than a transit agency, in which more than one person shares the use of the vehicle, such as a van or car, to make a trip. Also known as "carpooling" or "vanpooling."

Ringelmann Chart – A series of charts, numbered 0 to 5, that simulate various smoke densities by presenting different percentages of black. A Ringelmann No. 1 is equivalent to 20 percent black; a Ringelmann No. 5 is 100 percent black. They are used for measuring the opacity or equivalent obscuration of smoke arising from stacks and other sources by matching the actual effluent with the various numbers, or densities, indicated by the charts.

Risk Assessment – An evaluation of risk that estimates the relationship between exposure to a harmful substance and the likelihood that harm will result from that exposure.

Risk Management – An evaluation of the need for and feasibility of reducing risks. It includes consideration of magnitude of risk, available control technologies, and economic feasibility.

S

Sanctions – Actions taken against a state or local government by the federal government for failure to plan or to implement a State Implementation Plan (SIP). Examples include withholding of highway funds and a ban on construction of new sources of potential pollution.

Secondary Particle – Particles that are formed in the atmosphere. Secondary particles are products of the chemical reactions between gases, such as nitrates, sulfur oxides, ammonia, and organic products.

Secondary Pollutant – A pollutant formed in the atmosphere through the chemical or physical interaction between primary pollutants.

Secondary Air Pollution – Any pollution caused by reactions in air already polluted by primary emissions (from factories, automobiles and so forth). An example of secondary air pollution is photochemical smog.

Secondary standard – A pollution limit based on environmental effects such as damage to property, plants, visibility, etc. Secondary standards are set for criteria air pollutants.

Sensitive Groups – Identifiable subsets of the general population that are at greater risk than the general population to the toxic effects of a specific air pollutant (e.g., infants, asthmatics, and elderly).

Single-occupant Vehicles (SOVs) – A SOV is a vehicle used to get just one person to a destination.

Smog – A combination of smoke and other particulates, ozone, hydrocarbons, nitrogen oxides, and other chemically reactive compounds which, under certain conditions of weather and sunlight, may result in a murky brown haze that causes adverse health effects.

Smoke – A form of air pollution consisting primarily of particulate matter (i.e., particles released by combustion). Other components of smoke include gaseous air pollutants such as hydrocarbons, oxides of nitrogen, and carbon monoxide. Sources of smoke may include fossil fuel combustion, agricultural burning, and other combustion processes.

Solvent Base – Hydrocarbon- containing compounds such as paint thinner used for the purpose of thinning various types of coatings such as paint.

Soot – Very fine carbon particles that have a black appearance when emitted into the air.

Source – Any place or object from which air pollutants are released. Sources that are fixed in space are stationary sources and sources that move are mobile sources.

Stack – A chimney, that is, a vertical pipe or flue installed in buildings, power plants, and factories to remove exhaust gases and suspended particulate matter.

Stakeholders – Citizens, environmentalists, businesses, and government representatives that have a stake or concern about how air quality is managed.

State Implementation Plan (SIP) – A detailed description of the programs a state will use to carry out its responsibilities under the Clean Air Act. State implementation plans are collections of the regulations used by a state to reduce air pollution. The Clean Air Act requires that EPA approve each state implementation plan. Members of the public are given opportunities to participate in review and approval of state implementation plans.

Surface Transportation Program (STP) – A major funding program in TEA 21. STP monies are "flexible," meaning they can be spent on mass transit, pedestrian and bicycle facilities, as well as on roads and highways.

Stationary Sources – Relatively large, fixed sources of emissions such as power plants, refineries, and manufacturing facilities which emit air pollutants. (see also mobile sources).

Storage Tank – Any stationary container, reservoir, or tank used for storage of liquids.

Stratosphere – The layer of the Earth's atmosphere above the troposphere and below the mesosphere. It extends between 10 and 30 miles above the Earth's surface and contains the ozone layer in its lower portion. The stratospheric layer mixes relatively slowly; pollutants that enter it may remain for long periods of time.

Sulfates – (see Sulfur Oxides.)

Sulfur Dioxide (SO_2) – A criteria air pollutant. Sulfur dioxide is a gas produced by burning coal, most notably in power plants. Some industrial processes, such as production of paper and smelting of metals, produce sulfur dioxide. Sulfur dioxide is closely related to sulfuric acid, a strong acid. Sulfur dioxide plays an important role in the production of acid rain.

Sulfur Oxides – Pungent, colorless gases (sulfates are solids) formed primarily by the combustion of sulfur-containing fossil fuels, especially coal and oil. Considered major air pollutants, sulfur oxides may impact human health and damage vegetation.

T

Telecommuting – The substitution, either partially or completely, of transportation to a conventional office through the use of computer and telecommunications technologies (e.g., telephones, personal computers, modems, fax machines, E-mail). Implies either work at home or at a satellite work center that is closer to an employee's home than the conventional office.

Temperature Inversion – One of the weather conditions often associated with serious smog episodes in some portions of the country. In a temperature inversion, air doesn't rise because it is trapped near the ground by a layer of warmer air above it. Pollutants, especially smog and smog-forming chemicals, including VOCs, are trapped close to the ground. As people continue driving, and sources other than motor vehicles continue to release smog-forming pollutants into the air, the smog level keeps getting worse.

Thermosphere – The outermost layer of the Earth's atmosphere extending from about 60 miles to several hundred miles. The temperature of this layer varies from many hundreds to thousands of degrees Celsius.

Title III – A section of the 1990 amendments to the Clean Air Act that addresses the control of toxic air emissions.

Title V – A section of the 1990 amendments to the Clean Air Act that requires a federally enforceable operating permit for major sources of air pollution.

Topography – The configuration of a surface, especially the Earth's surface, including its relief and the position of its natural and man-made features.

Total Organic Gases (TOG) – Gaseous organic compounds, including reactive organic gases and the relatively unreactive organic gases such as methane.

Total Suspended Particulates (TSP) – Particles of solid or liquid matter – such as soot, dust, aerosols, fumes, and mist – up to approximately 30 microns in size.

Toxic Hot Spot – A location where emissions from specific sources may expose individuals and population groups to elevated risks of adverse health effects – including but not limited to cancer—and contribute to the cumulative health risks of emissions from other sources in the area.

Transit - Generally refers to passenger service provided to the general public along established routes with fixed or variable schedules at published fares. Related terms include public transit, mass transit, public transportation, urban transit and paratransit.

Transportation Control Measure (TCM) – Any control measure to reduce vehicle trips, vehicle use, vehicle miles traveled, vehicle idling, or traffic congestion for the purpose of reducing motor vehicle emissions. TCMs can include encouraging the use of carpools and mass transit.

Transportation Demand Management (TDM) – Low-cost ways to reduce demand by automobiles on the transportation system, such as programs to promote telecommuting, flextime and ridesharing.

Transportation Equity Act for the 21st Century (TEA-21) – The TEA-21 was enacted June 1998 and authorizes the Federal surface transportation programs for highways, highway safety, and transit for the 6-year period 1998-2003. TEA-21 is the nation's principal transportation law. It continues the essential features of ISTEA including a strong role for local elected officials in making transportation funding decisions through MPOs. The law provides increased funding for addressing highway, bridge and transit needs and greater flexibility for shifting funds among the various funding categories.

Transportation Improvement Program (TIP) – This is a document prepared by states and planning commissions citing projects to be funded under federal transportation programs for a full-year period. Without TIP inclusion, a project is ineligible for federal funding.

Transportation Management Area (TMA) – All urbanized areas over 200,000 in population. Within a TMA, all transportation plans and programs must be based on a continuing and comprehensive planning process carried out by the MPO in cooperation with States and transit operators. The TMA boundary affects the responsibility for the selection of transportation projects that receive Federal funds.

Transportation System Management (TSM) – The element of a TIP that proposes non-capital intensive steps toward the improvement of a transportation system, such as refinement of system and traffic management, the use of bus priority or reserved lanes, and parking strategies. It includes actions to reduce vehicle use, facilitate traffic flow, and improve internal transit management.

Travel-demand Management – Strategies to manage demand on roadways designed to redirect trips to higher-occupancy modes or away from peak-traffic periods so that the total number of vehicles trips are reduced. Can include both capital and service improvements to highways and transit, and may involve community action.

Troposphere – The layer of the Earth's atmosphere nearest to the surface of the Earth. The troposphere extends outward about 5 miles at the poles and about 10 miles at the equator.

U

Ultra-Low Emission Vehicle (ULEV) – Vehicles that meet the ARB ultra-low emission standards. These emission limits are between those for LEVs and ZEVs.

Ultraviolet B (UVB) – A type of sunlight. The ozone in the stratosphere, high above the Earth, filters out ultraviolet B rays and keeps them from reaching the Earth. Ultraviolet B

exposure has been associated with skin cancer, eye cataracts and damage to the environment. Thinning of the ozone layer in the stratosphere results in increased amounts of ultraviolet B reaching the Earth.

Underground Storage Tank (UST) – Refers to tanks used to store gasoline and other liquids underground.

United States Environmental Protection Agency (U.S. EPA) – The federal agency charged with setting policy and guidelines, and carrying out legal mandates for the protection of national interests in environmental resources.

Unit Risk Number – The number of potential excess cancer cases from a lifetime exposure to one microgram per cubic meter (μ/m_3) of a given substance. For example, a unit risk value of $5.5x10_{-6}$ would indicate an estimated 5.5 cancer cases per million people exposed to an average concentration of 1 μ/m_3 of a specific carcinogen for 70 years.

Urban Airshed Model – A three-dimensional photochemical grid model designed to calculate the concentrations of both inert and chemically reactive pollutants in the atmosphere. It simulates the physical and chemical processes that affect pollution concentrations.

V

Value Pricing – Direct time-of-travel charges for road use, these can vary by location, time of day, severity of congestion, vehicle occupancy, or type of facility. Value pricing charges are intended to promote economic efficiency, reduce congestion, improve air quality, conserve energy, meet transit productivity goals.

Vanpool – A paratransit service by van on a scheduled or unscheduled basis with at least five persons as occupants.

Vapor – The gaseous phase of liquids or solids at atmospheric temperature and pressure.

Vapor Density – The vapor density is expressed in grams per liter (g/L) and is compared to the density of air (air=1).

Vapor Pressure – The pressure, often expressed in millimeters of mercury (mm Hg) or pounds per square inch (PSI), that is characteristic at any given temperatures of a vapor in equilibrium with its liquid or solid form.

Vapor Recovery Systems – Mechanical systems that collect and recover chemical vapors resulting from transfer of gasoline from operations such as tank-to-truck systems at refineries, tanker-to-pipeline systems at offshore oil operations, and pump-to-vehicle systems at gasoline stations.

Variance – Permission granted for a limited time (under stated conditions) for a person or company to operate outside the limits prescribed in a regulation.

Vehicle Miles Traveled (VMT) – The miles traveled by motor vehicles over a specified length of time (e.g., daily, monthly, or yearly) or over a specified road or transportation corridor.

Viscosity – The degree to which a fluid resists flow under an applied force.

Visibility – A measurement of the ability to see and identify objects at different distances. Visibility reduction from air pollution is often due to the presence of sulfur and nitrogen oxides, as well as particulate matter.

Visibility Reducing Particles (VRP) – Any particles in the atmosphere that obstruct the range of visibility.

Volatile – Any substance that evaporates readily.

Volatile Organic Compounds (VOCs) – Carbon-containing compounds that evaporate into the air (with a few exceptions). VOCs contribute to the formation of smog and/or may themselves be toxic. VOCs often have an odor, and some examples include gasoline, alcohol, and the solvents used in paints.

V

Water Solubility – The solubility of a substance in water provides information on the fate and transport in the environment. The higher the water solubility, the greater the tendency to remain dissolved and the less likely to volatilize from the water. Low water soluble substances will volatilize more readily in water and will partition to soil or bioconcentrate in aquatic organisms.

Weight of Evidence – The extent to which the available information supports the hypothesis that a substance causes an effect in humans. For example, factors which determine the weight-of-evidence that a chemical poses a hazard to humans include the number of tissue sites affected by the agent; the number of animal species, strains, sexes, relationship, statistical significance in the occurrence of the adverse effect in treated subjects compared to untreated controls; and the timing of the occurrence of adverse effect.

Welfare-based Standard (secondary Standard) – An air quality standard that prevents, reduces, or minimizes injury to agricultural crops and livestock, damage to and the deterioration of property, and hazards to air and ground transportation.

Woodburning Pollution – Air pollution caused by woodburning stoves and fireplaces that emit particulate matter, carbon monoxide, and odorous and toxic substances.

Z

Zero Emission Vehicle (ZEV) – Vehicles that produce no emissions from the on-board source of power (e.g., an electric vehicle).

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